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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/028,305	12/28/2001	Gee Sung Chae	2658-0283P	2901

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EXAMINER

RUDE, TIMOTHY L.

ART UNIT

PAPER NUMBER

2871

DATE MAILED: 10/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n No.

10/028,305

Applicant(s)

SUNG CHAE ET AL

Examiner

Timothy L Rude

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-- Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 December 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on _____ is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art (APA) in view of Ueda et al (Ueda) USPAT 6,078,365.

As to claim 1, APA discloses a conventional liquid crystal display device in Figures 1-5 (Specification pages 1-5), comprising: a substrate, 1; a gate electrode, 3, over the substrate; a first semiconductor layer, 15, over the gate electrode; a second

semiconductor layer, 17, over the first semiconductor layer, source, 5, and drain, 7, electrodes (Applicant's first metal layer) on the second semiconductor layer, the first metal layer patterned in a same pattern as the second semiconductor layer such that the first metal layer and second semiconductor layer define the separation region (Figure 3C).

APA does not explicitly disclose source and drain electrodes over the first metal layer, the source and drain electrodes patterned the same as the first metal layer and the second semiconductor layer define first upper portion of the separation region, and the source and drain electrodes include a second and a third metal layer.

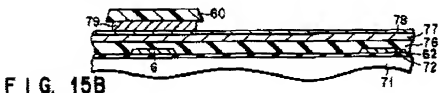
Ueda teaches and embodiment in Figures 15A-15F (col. 12, line 58, through col. 18, line 33, especially col. 16, line 64, through col. 18, line 33) the use of source, S, and drain, D, comprised of Aluminum and Molybdenum disposed on Molybdenum (Mo/Al/Mo) (comprises Applicant's electrodes over the first metal layer), the source and drain electrodes patterned the same as the first metal layer and the second semiconductor layer (col. 17, lines 22-42) define first upper portion of the separation region, and the source and drain electrodes include a second (Al) and a third (Mo) metal layer, in order to use a low resistance metal such as Aluminum for improved conductivity of the circuit components (col. 17, line 55, through col. 18, line 5).

Ueda is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add source and drain electrodes over the first metal layer, the source and drain electrodes patterned the same as the first metal layer and the second semiconductor layer define first upper portion of the separation region, and

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the source and drain electrodes include a second and a third metal layer in order to use a low resistance metal such as Aluminum for improved conductivity of the circuit components.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA with added source and drain electrodes over the first metal layer, the source and drain electrodes patterned the same as the first metal layer and the second semiconductor layer define first upper portion of the separation region, and the source and drain electrodes include a second and a third metal layer in order to use a low resistance metal such as Aluminum for improved conductivity of the circuit components.



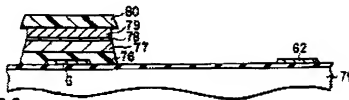


FIG. 15C

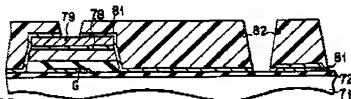


FIG. 15D

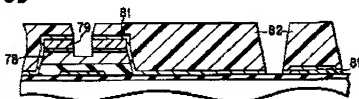


FIG. 15E

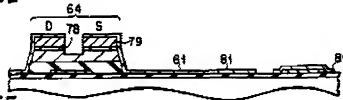


FIG. 15F

As to claim 8, the method of forming a liquid crystal display device, comprising:
forming a gate electrode on a substrate; forming an active layer over the gate electrode;
forming a first semiconductor layer over the active layer; forming a second
semiconductor layer over the first semiconductor layer; forming a first metal layer over
the second semiconductor layer patterning the first metal layer and the second
semiconductor layer in a same pattern; and forming a source electrode and a drain
electrode over the first metal layer, would have been obvious given the device structure
above and the teachings of Ueda (col. 12, line 58, through col. 18, line 33, especially
col. 16, line 64, through col. 18, line 33).

As to claim 2, APA discloses a device, further comprising: an insulating layer in between the gate electrode and the first semiconductor layer; a protective layer, 21, over the source and drain electrodes and defining a second upper portion of the separation region (Figure 3D) and a contact hole, 19b, exposing a portion of the drain electrode; and a pixel electrode, 23, in the contact hole (Figure 3E).

As to claim 3, APA in view of Ueda discloses the device of claim 1 above, wherein; the second metal layer includes aluminum (Al, Ueda, col. 17, lines 22-30).

As to claim 4, APA in view of Ueda discloses the device of claim 1 above, wherein the first and third metal layers are formed of the same material (Mo, Ueda, col. 17, lines 22-30).

As to claim 5, APA in view of Ueda discloses the device of claim 1 above.

The device of claim 1 above does not explicitly disclose a device wherein the first and third metal layers are formed of different materials.

Ueda teaches the use of a refractory metal of Cr or a Mo-Ta alloy (col. 12, lines 62-67) as art recognized equivalents suitable for the intended purpose of forming an undercoat conductive layer (MPEP 2144.07).

Ueda is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use Cr or a Mo-Ta alloy for one of the first or third

metal layers, resulting in the claimed device wherein the first and third metal layers are formed of different materials.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA in view of Ueda with the Cr or a Mo-Ta alloy for one of the first or third metal layers, resulting in the claimed device wherein the first and third metal layers are formed of different materials.

As to claim 6, APA in view of Ueda discloses the device of claim 1 above, wherein the first and third metal layers include molybdenum (Mo, Ueda, col. 17, lines 22-30).

As to claim 7, APA in view of Ueda discloses the device of claim 4 above, wherein the first and third metal layers are formed include molybdenum (Mo, Ueda, col. 17, lines 22-30).

As to claim 9, the method of claim 8, wherein forming the source and drain electrodes includes forming a second metal layer over the first metal layer, forming a third metal layer over the first metal layer, and patterning the second and third metal layers in the same pattern is the first metal layer and second semiconductor layer in the channel region so that a channel portion of the first semiconductor layer is exposed, would have been obvious given the device structure above.

As to claim 10, APA in view of Ueda discloses the method of claim 8 above, wherein the first and third metal layers include molybdenum (Mo, Ueda, col. 17, lines 22-30).

As to claim 11, APA in view of Ueda discloses the method of claim 9 above, wherein the first and third metal layers are formed of the same material (Mo, Ueda, col. 17, lines 22-30).

As to claim 12, APA in view of Ueda discloses the method of claim 9 above.

The method of claim 9 above does not explicitly disclose a device wherein the first and third metal layers are formed of different materials.

Ueda teaches the use of a refractory metal of Cr or a Mo-Ta alloy (col. 12, lines 62-67) as art recognized equivalents suitable for the intended purpose of forming an undercoat conductive layer (MPEP 2144.07).

Ueda is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use Cr or a Mo-Ta alloy for one of the first or third metal layers, resulting in the claimed method wherein the first and third metal layers are formed of different materials.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA in view of Ueda with the Cr or a Mo-Ta alloy for one of the first or third metal layers, resulting in

the claimed method wherein the first and third metal layers are formed of different materials.

As to claim 13, APA in view of Ueda discloses the method of claim 9 above, wherein; the second metal layer includes aluminum (Al, Ueda, col. 17, lines 22-30).

As to claim 14, APA in view of Ueda discloses the method of claim 9 above, wherein the first and third metal layers include molybdenum (Mo, Ueda, col. 17, lines 22-30).

As to claim 15, APA in view of Ueda discloses the method of claim 8 above, wherein the patterning of the first metal layer and second semiconductor layer define channel region includes removing a portion of the first metal layer and second metal layer corresponding to the gate electrode and exposing the first semiconductor layer (Figure 15F, and col. 17, lines 14-67).

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy L Rude whose telephone number is (703) 305-0418. The examiner can normally be reached on Monday through Thursday.

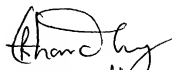
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H Kim can be reached on (703) 305-3492. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4900.



TLR

Timothy L Rude
Examiner
Art Unit 2871



T. Chandhary
Primary Examiner
Tech. Center 2800